

WHAT IS CLAIMED IS:

1. A disk drive comprising:

a head which reads data signals from any data region provided on a disk-shaped recording medium;

5 a phase-locked loop unit which generates a read clock signal;

a read channel which reproduces data from any data signal that the head has read from the disk-shaped recording medium, in synchronism with the read clock signal generated by the phase-locked loop unit; and

10 a controller which alters a PLL parameter of the phase-locked loop unit when the data recorded by the read channel contains an error, said PLL parameter being related to a frequency-jitter part existing, due to the error, in PLL sync data recorded in the data region, and which performs a read-retry in accordance with the PLL parameter thus altered, to cause the read channel to read the data again.

20 2. The disk drive according to claim 1, wherein the controller alters, as PLL parameter, any one of a plurality of operating parameters of the Phase-locked loop unit, including a timing for acquisition mode, a gain for the acquisition mode and a gain for tracking mode.

25 3. The disk drive according to claim 1, wherein the controller alters a timing for acquisition mode

and a gain for the acquisition mode, selected from
a plurality of operating parameters of the Phase-
locked loop unit, and alters a combination of
the parameters, as PLL parameter, to performs the
5 read-retry.

4. The disk drive according to claim 1, wherein
the controller alters the PLL parameter of the Phase-
locked loop unit to set a gain for acquisition mode at
a value lower than a value usually applied.

10 5. The disk drive according to claim 1, wherein
the controller has means of altering, as PLL
parameter, any one of a plurality of operating
parameters of the phase-locked loop unit, including
a timing for acquisition mode, a gain for the
15 acquisition mode and a gain for tracking mode; alters
a combination of the timing and the gain, both for
acquisition mode, as PLL parameter, to performs the
read-retry; and changes the timing and gain for
acquisition mode, back to normal values and alters the
20 gain for tracking mode to perform the read retry, when
the read retry is unable to recover the error.

25 6. The disk drive according to claim 1, wherein
the controller has means of altering any one of a
plurality of operating parameters of the phase-locked
loop unit, including a timing for acquisition mode, a
gain for the acquisition mode and a gain for tracking
mode; alters the gain for tracking mode, as PLL

parameter, to perform the read retry; and changes the gain for tracking mode, back to normal values, when the read retry is unable to recover the error, and alters a combination of the timing and the gain, both
5 for acquisition mode, to performs the read-retry.

7. The disk drive according to claim 1, wherein the controller alters the PLL parameter of the Phase-locked loop unit to set a gain for acquisition mode at a value lower than a value usually applied, and a gain
10 for tracking mode at a value higher than a value usually applied.

8. The disk drive according to claim 1, wherein the controller alters an operating parameter of the read channel, other than the PLL parameter, to perform
15 an ordinary read-retry, then alter any one of a plurality of a plurality of operating parameters of the phase-locked loop unit to perform the read-retry when the ordinary read retry is unable to recover the error.

20 9. The disk drive according to claim 1, wherein the controller alters any one of the PLL parameters to perform the read-retry at first step, and alters an operating parameter of the read channel, other than the PLL parameter, to perform the ordinary read-retry
25 again when the first step read-retry is unable to recover the error.

10. A disk drive comprising:

a head which reads data signals from any data region provided on a disk-shaped recording medium;

a phase-locked loop unit which generates a read clock signal and which has a plurality of PLL parameters;

a read channel which reproduces data from any data signal that the head has read, in synchronism with the read clock signal generated by the phase-locked loop unit; and

a PLL control unit which alters any one of the PLL parameters of the Phase-locked loop unit, including a timing for acquisition mode, a gain for the acquisition mode and a gain for tracking mode;

a detecting unit which detects an operating condition of the phase-locked loop unit; and

a controller which alters any one of the PLL parameters when the detecting unit detects that the phase-locked loop unit is operating in an abnormal condition due to an error in the data reproduced by the read channel, and which cause the reach channel to read the data again in accordance with the PLL parameter altered.

11. The disk drive according to claim 10, wherein the controller causes the read channel to perform an ordinary read-retry in accordance with an operation parameter of the read channel, other than the plurality of PLL parameters, when the phase-locked

loop unit operates in a normal condition.

12. The disk drive according to claim 10, wherein the detecting unit acquires, as data representing the operating condition of the phase-locked loop unit,
5 information about a phase error or a frequency error made in acquisition mode or in tracking mode.

13. The disk drive according to claim 12, wherein the controller causes the read channel to perform a read-retry in accordance with information obtained
10 from the detecting unit when the phase error or frequency error made in the acquisition mode or in the tracking mode exceeds a permissible value.

14. A disk drive comprising:

a head which reads data signals from any data
15 region provided on a disk-shaped recording medium;

a read channel which reproduces data from any data signal that the head has read; and

a controller which causes the read channel to perform a read-retry when an error occurs in data
20 reproduced by the read channel and cause the head to write, in the data region, the same data that the head has read, when the error is recovered by the read-retry.

15. The disk drive according to claim 14, further
25 comprising a verification unit which reads and verifies data after the head has written the data under control of the controller.

16. The disk drive according to claim 15, further comprising a unit which causes the head to write the data in a data region other than the data region from which the read channel has read the data, when the
5 verification unit detects an error in the data.

17. A read channel for reproducing data from a disk medium by using a head in a disk drive, comprising:

a phase-locked loop unit which has a plurality of
10 PLL parameters and which generates a read clock signal required in reproducing data from the disk medium;

a PLL control unit which sets or alter any one of the PLL parameters including a timing for acquisition mode, a gain for the acquisition mode and a gain for
15 tracking mode;

a unit which transmits information about an operating condition of the phase-locked loop unit, to an external device, said information representing a phase error or frequency error made in the acquisition
20 mode or in the tracking mode.

18. A method of reproducing data from a disk medium by using a head in synchronism with a read clock signal generated by a phase-locked loop unit in a disk drive, the method comprising:

25 performing an ordinary read-retry when a read error is made while the head is reproducing the data from the disk medium; and

performing a read-retry when the ordinary read-retry fails to recover the read error, by altering any one of PLL parameters of the phase-locked loop unit, including a timing for acquisition mode, a gain for
5 the acquisition mode and a gain for tracking mode.

19. The method according to claim 18, further comprising:

detecting an operating condition of the phase-locked loop unit when a read error is made while the
10 head is reproducing the data from the disk medium; and

performing a read-retry by altering any one of the PLL parameters, when the operating condition of the phase-locked loop unit exceeds a permissible value.

15 20. The method according to claim 18, further comprising:

writing data in a data region of the disk medium when the read-retry recovers the error, said data being the same data the head has read from the data
20 region.